Children as design partners: Guiding the development of a pet-related website

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Introduction

The information gathered for this action research project is intended to guide the development of a child-friendly, engaging, pet-related website. It is anticipated that this website will influence a new generation of pet owners and have a positive impact on the health, well-being, and general welfare of animals. Most pet owners want to take good care of their animals. Experience suggests that, in the vast majority of apparent neglect situations, the problem can be traced back to a lack of knowledge or understanding of proper animal husbandry. People simply do not know the "how", "what", "why", "when", etc. of providing for the needs of their pets. Information that may seem basic or "common sense" for many individuals is not "basic" for a large segment of the population. In addition, it is important to note that this lack of understanding can be seen with people from all education levels. This knowledge gap does not discriminate! It may be possible to narrow this knowledge gap for future pet owners if an appropriate pet-related website is designed for third through sixth grade students. An appropriate site is one that this population will actually use to acquire information about how to properly care for their pets. If these potential pet owners use the website and learn how to meet the needs of their pets, then the jobs of animal health professionals will be much easier and less frustrating in the coming years.

Improving the health and well-being of animals starts with a knowledgeable owners. Education that begins with young people can have the added benefit of these influential individuals educating their parents and guardians about proper pet care. Young people enjoy using computers and other information technologies to learn about topics of interest to them. This project is designed to ascertain which website features and pet care topics are most important to these individuals. Data gathered from students in grades 3-6 will guide the design

of a pet-related website targeting this population of children. Information presented on the website will permit children to learn about animal-related topics using their identified preferences and authentic, meaningful activities.

This project was formulated using knowledge gained from readings (Mertler, 2012; Mills, 2011) and course lectures. A variety of action research models were examined in preparation for this project. Although there were minor differences in terminology or complexity of the steps, the basic structure for the models included observation of a problem or situation, reflecting on the issue, planning an intervention or innovation to affect a change, acting on or implementing the plan, and reflecting on the findings. This basic cycle can be repeated indefinitely. The following diagram (Figure 1) from Mertler (2012) provides a visual representation of the action research process used for this project.

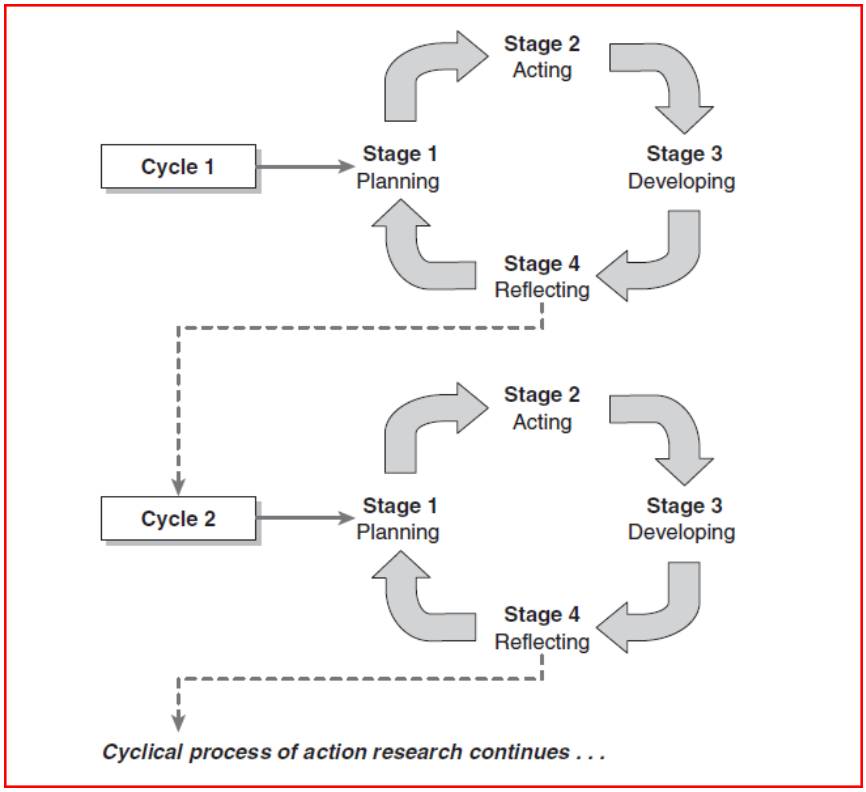


Figure 1. This figure illustrates the cyclical nature of action research.

Although the model illustrated above provides sufficient information about the entire process, action research is not always straight forward and does not always follow textbook diagrams. Just like life, action research can be messy. The action research process can be interrupted, re-evaluated, modified, and the updated version can be implemented without completing a full cycle. The process that was followed to complete this action research project is outlined in the following section.

Together with the above introduction, this project is comprised of several parts. The remaining sections include: the area of focus statement; the research questions that this project investigated; a review of related literature; a description of the intervention or innovation; the membership of the action research group; negotiations which were undertaken to complete this project; a timeline of key activities; data collection and analysis; an interpretation and discussion of the findings; an action plan that includes the next steps for this area of focus; a list of references and an appendix. The following section introduces the area of focus.

Area of Focus Statement

The purpose of this study was to acquire data from students in grades 3 through 6 that could be used to guide the development of a child-friendly website devoted to pets and pet care topics. This study was an outgrowth of a project that our team, Team Chaos, worked on during the fall semester of 2011. We worked on a dog bite prevention program and taught dog safety information to students at a middle school in central Iowa. A “bare bones” website was established to permit other teachers and students to access the information. The hope was that each year more students would learn how to be safe when interacting with dogs. A separate, but related project involved writing a critique of a website. A governmental, animal health-related website (for children) was evaluated using specific criteria; however, to complete this

project, input was solicited from children who were representative of the website's targeted age groups. The student feedback suggested that this specific website was not having the intended impact on the stated target population because it lacked "pizzazz". One student described it as being "kind of interesting, but it had too much reading and it needed some games" (personal communication). The insight gained from this student provided an "aha" moment related to website development. Before expending tremendous resources on the design of a pet-related website for students it would be important to ask them how they preferred to learn information and about the features that they enjoyed on "fun" or "cool" websites.

This action research project will take the information gathered from the intended end-users and use the data to drive the development of a pet-related website. As a veterinarian, I think I know what students want to learn about animals or what features students enjoy using on various websites. Unfortunately, until students are invited and encouraged to tell a website developer what they want to learn and how they like to learn, time and money will be wasted. In order to determine what students want on a website, two key questions that required answers were identified.

Research Questions

This project will address two specific questions:

1) Which website features will students in grades 3 through 6 identify as capturing and maintaining their interest and attention?

2) What topics related to pets and pet health will interest the selected target audience?

Review of Related Literature

This literature review focuses on three themes. The first theme highlights the importance of enlisting children as design partners and using the data collected from the target population to design fun and educational websites or gaming technologies. Next, the motivational benefits of incorporating animal-related components in website or gaming design are presented. Finally, the various data collection methods that have been utilized by researchers to identify appropriate features to incorporate in website or game design are discussed. The goal of this final section was to identify the optimal data collection method to use for this project.

Children as design partners

Several authors discuss the importance of involving members of the target audience early in the design process through "participatory design" (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005) or as "design partners" (Bekker, Beusmans, Keyson, & Lloyd, 2003; Interaction Design and Children, 2003; Lazaris, 2009; Williamson, 2003) rather than including these individuals as simply end-users or usability testers prior to the release of a product. Williamson (2003) stated that roughly 5% of companies that develop technologies for children actually invite the participation of these individuals in the design phase. The majority of commercial entities may include children in testing the product prior to release, but they fail to recognize how to meet the needs of this demographic. They simply do not ask the right people (children) the right questions.

Using an analogy from the veterinary profession, members of the veterinary community are constantly reminded that cats are not small dogs. Veterinarians cannot prescribe the same drugs or treatments for a cat that might be appropriate for dogs—the anatomy is very similar, but the physiology is very different. A medication that is safe for a dog may result in the death of

a cat. They are both animals, but they are distinct species! Whether educators, website designers, physicians, etc. adults must be cognizant of the fact that children are not small adults. These young people have different ideas about what is exciting, interesting, funny, boring, and captivating. Color combinations and design layouts that would alienate adults tend to be the ones that appeal to children (Lazaris, 2009). The creation of an upbeat mood, incorporation of thematic features familiar to children, large or bold design elements, opportunities for imaginative interaction on a site, multiple dimensions or levels, high quality animation, sound, games, the ability to express oneself artistically—through drawing, writing or other creative processes, and simplified navigation are all features that Lazaris (2009) reports as being important to children when they are using a website. Many of these same features would make adults feel as though they were on a website made by or for people with attention deficit disorder; however, adults are not the intended audience!

Several companies, such as Disney and PBS, have invested considerable resources to gather behavioral information about children. Their child-friendly websites serve as excellent examples of the types of features and design elements to include when developing a new website for children (Lazaris, 2009). When designing for children, one must remember that THEY will be using the website—not adults—and plan accordingly. Lazaris (2009) also comments that designers who observe children as they use websites can gain valuable information about what children enjoy and then translate that knowledge into a high quality website that will capture the interest of this population. Participatory design models such as the one used in the development of *Quest Atlantis* (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005) take a tremendous commitment of manpower, time, finances, and other resources; however, the final product is a highly engaging, multilevel, interactive, and motivational learning

tool. Williamson (2003) wrote that the involvement of children early in the design process is increasingly viewed as being the best way to avoid investing tremendous time and finances in products that children are either not interested in using or that are too difficult for them. In the cooperative inquiry model described by Williamson (2003), children are members of a multigenerational and multi-disciplinary design and development team. The downside to this model is that it works best with small groups of children and the entire process can take the better part of 12 months to produce a finished product. However, cooperative inquiry can be adapted to work within various constraints and the final products engage children in a variety of authentic learning activities (Rieber, Luke, & Smith, 1998; Williamson, 2003).

Nielson (2010) cautioned website designers about thinking they can design for "children" as a broad category that includes everyone from age 3-12 years of age. He suggested three possible age groupings to target when designing materials for children: 3-5 years, 6-8 years, and 9-12 years. Children in his study responded negatively to material that was developed for students who were one grade above or below their personal grade level. Nielson (2010) wrote, "A 6-year-old said, 'This website is for babies, maybe 4 or 5 years old. You can tell because of the cartoons and trains'" (p. 8). These findings emphasize the importance of knowing the audience and not making assumptions about what young consumers want! Although this study was limited to approximately 35 subjects, it builds upon research data gathered from 55 students nine years earlier.

Finally, when children are engaged in the design process a key, desired outcome is the development of enhanced websites and gaming technologies. Bekker et al. (2003) gathered data to determine what interested the students, identify gender differences, evaluate vocabulary and grammar levels, and focus on the animals that the participants were most interested in

learning about. The knowledge the researchers acquired by working with children from the beginning of the project was invaluable and resulted in the development of a better educational gaming product. An added benefit of including children as design partners relates to the valuable skills that the children either strengthen or develop through their active participation in this process. For example, Bekker et al. (2003) and Rieber, Luke, and Smith (1998) describe benefits such as: improved leadership skills, better teamwork and collaborative behavior, increased mutual respect, better negotiation strategies, improved motivation to learn content material due to active engagement in authentic learning, improved decision-making strategies, higher levels of self-worth and gains in social standing. Involving children as design partners is a win-win situation for all! Engaging students in authentic activities, such as website design, provides motivation to participate and learn. An additional motivating component relates to the inclusion of meaningful, experiential or familiar themes (such as animals) to capture student interest. This component will be discussed in the following section.

Motivational benefits of incorporating animal-related themes

Animals of all kinds are kept as pets by people from diverse cultural backgrounds. It is not a practice that is restricted to the United States of America, the United Kingdom, Canada, or Brazil. Pets are being kept by people in China, Japan, India, parts of Africa, the Middle East, etc. Pets are kept by people from all socioeconomic levels—they are not just for the rich and famous!

Research shows that a child's desire to own a pet frequently extends into his or her dreams and fantasies (Daly & Suggs, 2010). This is not surprising given the number of stuffed animals, animal-themed story books, animal-related movies, etc. that are showered on children from the day they are born. Toys such as Teddy bears, toy lambs, sock monkeys, and stuffed

toy cats and dogs are big sellers. Disney movies such as *Lady and the Tramp*, *101 and 102 Dalmatians*, and *The Aristocats* generate large sums of money for this entertainment giant because they appeal to children and adults. As an example, the production budget for *Lady and the Tramp* was a mere $4 million dollars yet it generated over $93 million dollars (Lady and the Tramp, 2012). A significant number of children went to this movie or watched it on television or DVD—and this represents just one of many movies that feature animals or animals and children. Kids like animals!

Friedmann and Son (2009) discuss how humans benefit from the human-animal bond. Animals have been shown to enhance social interactions by erasing barriers such as wheelchairs or white canes. When individuals with disabilities are accompanied by their assistance animals, other people talk to them more often. The assistance animal facilitates increased human-to-human interaction. People like to pet, stroke, touch and talk to animals, and talk to people who have pets—or service animals. Animals also can have a positive impact on owner health. These health benefits may include things such as lowered blood pressure, decreased stress, improved physical conditioning (especially for dog owners), and improved mental health (Friedmann & Son, 2009).

Although much is written about the benefits of animals, there are potential hazards, such as zoonotic diseases (Friedmann & Son, 2009) and injuries inflicted by animals on people. At the extreme end of the spectrum, related to the role of pets as they relate to humans, is the position held by Archer (1996). He views pets as parasites that divert valuable resources from the survival and improvement of the general human condition. According to Archer (1996), humans are manipulated by the pets into providing these animals with what they need to survive and, in some situations, people help preserve their animal's genetic material by permitting the

animal to reproduce. These are interesting and thought provoking views; however, this research project focuses on the positive impact of pets and animals on humans and how this bond provides motivation for children to engage in active, meaningful learning.

A few studies utilized animal-related themes to provide subject matter that was familiar and interesting to students so that associated activities would be motivating, stimulating, and authentic. Virtual pets increased the amount of effort that Chinese students expended learning a language task, (Chen, Liao, Chien, & Chan, 2011); animals in the classroom improved student empathy and socio-emotional skills, (Daly & Suggs, 2010); and Bekker et al. (2003) used animals in a zoo to engage children as design partners. The children involved with this zoo project provided valuable insights to the adult members of the design team and this collaborative effort lead to the development of a portable, educational game device that would be used by children touring a zoo to learn about the animals. The mobile game, *Savannah*, developed by Facer, Joiner, Stanton, Reid, Hull, and Kirk (2004) used lions and their natural behaviors to engage students in an active and interactive educational game designed to instruct children about animal behavior. This immersive game permitted the children to take on the actions and behaviors of the lions. Because of the fact that they were now “lions”, the students learned about the dangers that lions faced and how the lions had to work in cooperative groups to capture prey (Facer et al., 2004). The topic of fish conservation strategies was the focus of the interactive, educational game designed by Lin, Hsieh, Wang, Sie, and Chang (2011). College-aged students served as usability testers for this product. By participating in virtual fishing activities, these individuals learned about how pollution and non-native species of fish could destroy habitats for the more desirable game fish.

Finally, Daly and Suggs (2010) examined teachers' perceptions of the benefits students experience from having animals in their elementary classrooms. Teachers reported improved empathy and increased socio-emotional development as key benefits. According to Daly and Suggs (2010), children possess a strong desire to have pets, their dreams frequently contain animals, children's books are full of animal images, and there is a distinct human interest in non-human animals. Teachers reported that students liked to take care of, interact with, draw pictures of and write stories about the animals in the classroom. Teachers who used images or stuffed toy animals also observed student engagement in activities related to these inanimate representations of living creatures. Although there are liability concerns associated with keeping animals in a classroom, the teachers who participated in the study believed the benefits derived from the students' interactions with animals outweighed the potential legal issues (Daly & Suggs, 2010).

Animals have been and continue to be a source of interest and motivation for people of all ages. They are familiar, tangible beings that have special meaning for most humans. It makes sense to use animal themes to capture the attention and imagination of students. It also makes sense to translate that interest into authentic learning opportunities that have meaning for the learners. By identifying what students want to learn about animals and how they want to acquire the information, it should be possible to design a website that meets the needs of the target population. This leads to the next question: How does a person interested in designing a website gather pertinent information from the intended audience?

Data collection methods used by researchers

The literature revealed that researchers utilized a wide variety of data collection methods which ranged from questionnaires or surveys (Clark & Ernst, 2009; Daly & Suggs, 2010; Eskil,

Ozgan, & Balkar, 2010; Facer, Joiner, Stanton, Reid, Hull, & Kirk, 2004), observations (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005; Facer et al., 2004; Lazaris, 2009; Nielsen, 2010), achievement tests (Chen, Liao, Chien, & Chan, 2011; Mislevy, 2010), motivational scales (Chen, Liao, Chien, & Chan, 2011; Eskil, Ozgan, & Balkar, 2010), system logs (Chen, Liao, Chien, & Chan, 2011), system usability interviews, field notes, journals, videos, email correspondence, student work (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005; Bekker, Beusmans, Keyson, & Lloyd, 2003; Facer, Joiner, Stanton, Reid, Hull, & Kirk, 2004), and personal data forms (Eskil, Ozgan, & Balkar, 2010). Patterns emerged (See Appendix A) which revealed that when projects extended beyond several months duration; where researchers were associated with multiple sites for gathering information; where there were large research teams; and where sample sizes were below approximately 60 individuals, the researchers used methods such as interviews, observations, journals, videos, etc. These data collection methods are much more labor intensive both to gather and analyze; however, the data that are collected provide significantly more information than the less involved, more close-ended responses typically obtained via questionnaires or surveys.

In contrast to the methods listed above, studies that were completed over a period of a few months and/or those with larger populations in their sample size (greater than 60 subjects) relied heavily upon questionnaires and surveys to collect data. For example, Eskil, Ozgan, and Balkar (2010) had over 260 participants and they utilized opinion and attitude surveys as well as personal data forms to collect information; Daly and Suggs (2010) surveyed 75 teachers to evaluate their perceptions about animals in classrooms; Barab, Thomas, Dodge, Carteaux, and Tuzun (2005) used questionnaires when they were gathering information from approximately 200 students while modifying the *Quest Atlantis* materials; and Clark and Ernst (2009) used an

online survey to gather data from over 250 people for a project designed to acquire personal views about using gaming technology in education. It became clear that the best option for gathering data from a large number of participants within the time constraints of this project would be through the use of a survey or questionnaire.

Summary

The research conducted by Barab, Thomas, Dodge, Carteaux, and Tuzun (2005); Bekker, Beusmans, Keyson, and Lloyd, (2003); Facer, Joiner, Stanton, Reid, Hull, and Kirk, (2004); Interaction Design and Children, (2003); Lazaris, (2009); Rieber, Luke, & Smith, (1998) and Williamson, (2003) all support the inclusion of children as members of the design team at the beginning of a project. In addition, many of these researchers also used animal-themed subject matter to provide familiar and interesting content for learners (Bekker, Beusmans, Keyson, & Lloyd, 2003; Chen, Liao, Chien, & Chan, 2011; Facer, Joiner, Stanton, Reid, Hull, and Kirk, 2004). Finally, as a result of the information gleaned from the review of pertinent literature, it appeared as though a survey would facilitate the collection of data from a large population of students in an abbreviated period of time.

The information gained through this literature review supported the following views: children should be included early in the design process; topics related to pets or other animals can help motivate children to become engaged in learning content; and that a survey instrument would provide sufficient preliminary data to help determine whether the development of a pet-related website for students in grades 3 through 6 would be a reasonable endeavor.

Intervention

Students in grades 3 through 6 served as design partners in the preliminary stages of website planning. Information was gathered from the target population using a ten question survey instrument that included multiple-choice and some open-ended response options. The intended purpose of the collected data is to guide the development of a pet-related website that appeals to children in grades 3 through 6. The members of the action research group who contributed to the completion of this study are identified in the following section.

Membership of the Action Research Group

The members of this action research group included: cooperating teachers, principals, students, and parents. Membership in the action research survey group was determined by making contact with colleagues who were currently teaching students in the target grades. Principals of the elementary and middle schools were contacted to obtain permission for classes to participate in the survey. Parental involvement was restricted to the provision of permission for their child(ren) to participate in accordance with school policies. The cooperating teachers volunteered to provide students with a few minutes of class time to complete the survey. Last but not least, the students played a vital role by completing the survey.

The initial survey group included schools in Iowa, Missouri, and Georgia. Permission to survey the students was obtained from the principals of all three schools; however, the Missouri school principal requested that permission also be obtained from the district office. The director of assessment for this particular school district did not grant permission for the students to complete the survey.

In an effort to gather additional data points, the survey link was posted on a popular social networking site. Parents of children in third through sixth grade were asked to allow their students to complete the survey. This request generated additional responses from third, fourth and fifth grade students in Iowa and Illinois. Although no information is available about the schools attended by children who participated via Facebook®, information about the Georgia and Iowa schools is outlined below.

Descriptions of participating schools

The Georgia elementary school serves a population of students of very low socioeconomic status. Nearly all students receive free or reduced meals. This school is an inner-city area. The student body racial composition is predominantly minority with over 95% of students identified as African-American or Hispanic. The school has limited resources for basic supplies and even fewer resources for technology. Classrooms have one to two computers and televisions that frequently are in non-working condition. The cooperating teacher at this school writes small grant proposals to obtain basic school supplies such as pencils, paper, scissors, crayons, puzzles, markers, etc. The teacher reported that a rare student might have access to a computer at home.

The Iowa school is situated in a small community (mixed rural and urban) located a short distance from a large Iowa city. The middle school sixth grade students come from a low socioeconomic status (SES) with 58% of the target population receiving free and reduced lunch. Several students who completed the survey have Individual Education Plans (IEPs) and receive instructional interventions during a regular school day. The students have access to mobile computer labs which permit students to use computers several times a week. The classroom is

equipped with technology including television(s), computers that link to projectors, internet access, and an ELMO projector. Many of these students have computer access at home.

Survey participants

The survey was completed by a total of 103 students from: Iowa (74 students); Georgia (19 students); and Illinois (10 students). The gender distribution was 59 male students: 44 female students. There were thirty-five third grade students, fourteen students were in fourth grade, one student was a fifth grader, and the remaining fifty-three students were sixth graders. Although the identity of the two schools is known (a middle school in Northwest Iowa—53 sixth grade students and an elementary school in a large city in Georgia—19 third grade students), there is no information about the schools attended by the children who completed the survey via the social networking link—31 students in third, fourth or fifth grade. Prior to gathering data from these survey participants, several negotiations had to be completed.

Negotiations Undertaken

Three colleagues at schools in Iowa, Georgia, and Missouri were contacted to request their assistance with the action research project. These teachers were willing to allow their students to participate. The principals of each school were sent letters (See Appendix B) via an email which outlined the nature of the research project. Principals from all three schools granted permission for student participation. The principal of the Missouri school requested additional approval from the district office. A letter outlining the research project was sent to the district office via email attachment and reached the level of the director of assessment. After a two week wait and two follow-up emails, the school district's director of assessment declined participation for the Missouri elementary school.

Teachers at the Iowa and Georgia school also had copies of letters (See Appendix B) for parental permission and student assent. The majority of students received parental permission and agreed to participate. Students were denied access to the survey link if their parents did not give permission for participation in the research project.

Additional negotiations included interactions with members of the course cohort, the course instructor, and relatives and friends on Facebook^{R}. Members of the cohort and the course instructor provided valuable feedback on preliminary drafts of the survey. The project researcher invited several young relatives to test the draft survey prior to distributing the link; however, they did not follow through with the testing process. Friends (adults) on Facebook^{R} actually tested the survey and link. This test allowed problems to be identified and corrected prior to releasing the final version of the survey. The following project timeline provides a condensed overview of the sequence of steps taken to complete this action research project.

Project Timeline

Table 1, adapted from Mills (2011), summarizes the many steps required to successfully complete this project.

Table 1

Action research project timeline.

Phase one	January to March 2012	Identify area of focus Develop research questions Make contact with classroom teachers Conduct literature review Write first draft of literature review Develop preliminary draft of survey Test draft survey Draft letters for principals, parents, and students
Phase two	March 9 to April 6, 2012	Obtain permission to survey students Release survey link Collect and analyze data Begin writing portions of the action research project: Introduction, area of focus, research questions, intervention/innovation, membership, negotiations, timeline, make corrections to literature review
Phase three	April 6 to April 20, 2012	Continue data analysis and interpretation Write findings section Begin action planning phase Start developing presentation to share results
Phase four	April 20 to April 27, 2012	Action planning continues Complete action research project and presentation Share results with cohort members and participating teachers

Data Collection and Analysis

A survey facilitates fairly rapid retrieval of information from a large population of individuals. After reading several resources related to survey design, a commercially available survey software, SurveyMonkey^{R} , was selected for this project. This survey tool is user-friendly in terms of question design, editing questions, and collecting and analyzing data. The Gold package offered additional benefits such as developing a longer survey, collecting responses via web links or email links, summarizing the data, and displaying the information in a variety of graphic formats. The data also can be downloaded in spreadsheet format and a variety of sorting filters and crosstab data comparisons can be used to help the novice researcher identify trends.

A preliminary draft survey was developed and input regarding the complexity of questions, consistency of question formatting, and length of responses was obtained from members of the action research course cohort. The survey was modified and additional feedback was obtained prior to entering the questions on SurveyMonkey^{R}. The first version of the SurveyMonkey^{R} instrument was tested with adult users of Facebook^{R}. These adults were able to identify problems with some of the questions and the survey link. These issues were corrected prior to releasing the link to the cooperating teachers.

Teachers were sent a link to ten-question, multiple choice survey (See Appendix C) developed by the researcher. The cooperating teachers released the link to the participants. The survey remained open for data collection for a period of approximately two weeks. The students were able to “click” on short answers to the questions and they had the option of writing in a response if they selected “other”. Basic information about computer usage, computer access, grade level, age, gender and state of residence was collected. These data

provided the researcher a better understanding of the respondents, their skill with computers, and the geographic area they represented. These questions also made it possible for the researcher to analyze responses by gender, grade and geographic area.

The survey gathered information to specifically address the research questions. First, which website features would students in grades 3 through 6 identify as capturing and maintaining their interest and attention? Possible responses to survey questions designed to address this research question included: games, videos, interacting on social media, listening to music, and reading feature stories. Second, what topics related to pets and pet health would interest the selected target audience? Examples of responses to the survey question that addresses this research question included: pet health, animal behavior, careers that involve working with animals, stories about children and their pets, and fun facts about animals.

The multiple choice survey used for this project permitted the researcher to gather quantitative data. Descriptive statistics in the form of percentages were used to analyze data gathered from 103 respondents. The initial analysis of 103 responses was followed by the application of a variety of filters and crosstab functions to identify trends or patterns of responses. Filters and crosstabs were used to look for differences related to gender, geographic location, and grade level. The findings are shared in the next section.

Findings

Responses to several survey questions are shown below, see Appendix D for additional graphic representations of the data. Questions are grouped when appropriate into general computer usage, responses addressing the research questions, and responses that are evaluated using a variety of filters and/or crosstabs: geographic, grade levels, and gender.

Computer usage

Over 52% of the 103 students reported using a computer at least weekly while 39% indicated that they used a computer every day. In addition, 90% of respondents used a computer at school and over 78% reported that they had access to a computer at home (See Figure 2). Note: percentages for the question regarding where the students use a computer exceed 100% because students were encouraged to select all applicable responses.

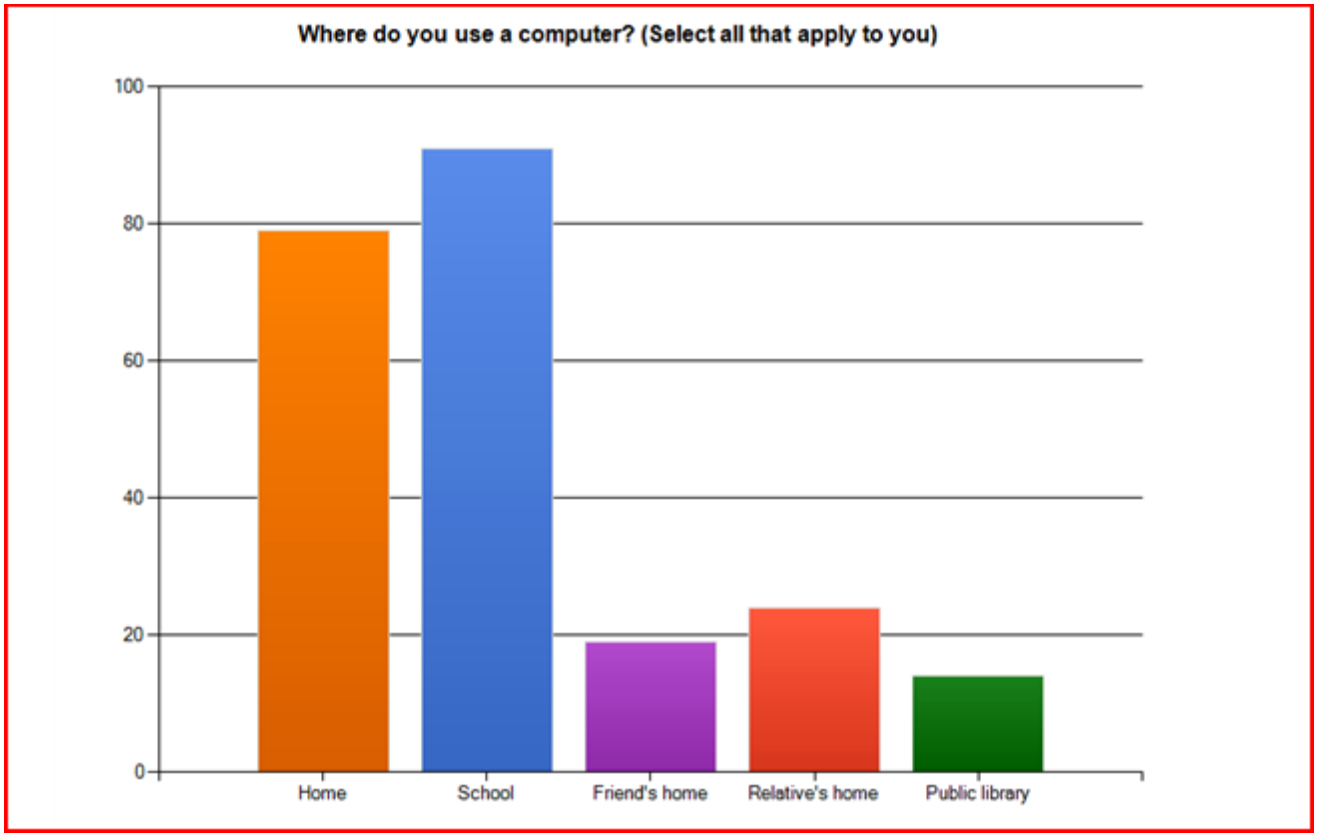


Figure 2. Graph illustrating where students access a computer.

Of the 101 participants who responded to question three (See Figure 3), approximately 84% use the computer for gaming, 80% surf the internet, 64% of students use the computer to connect with others (combined email and online chat responses), and 51% report using the computer for homework activities. (Note: Facebook and other social networking sites were not

included as possible responses due to the age of the survey participants. The researcher felt that the inclusion of these sites was inappropriate because social networking sites have minimum age limits and none of the participants were old enough to have "legal" accounts.)

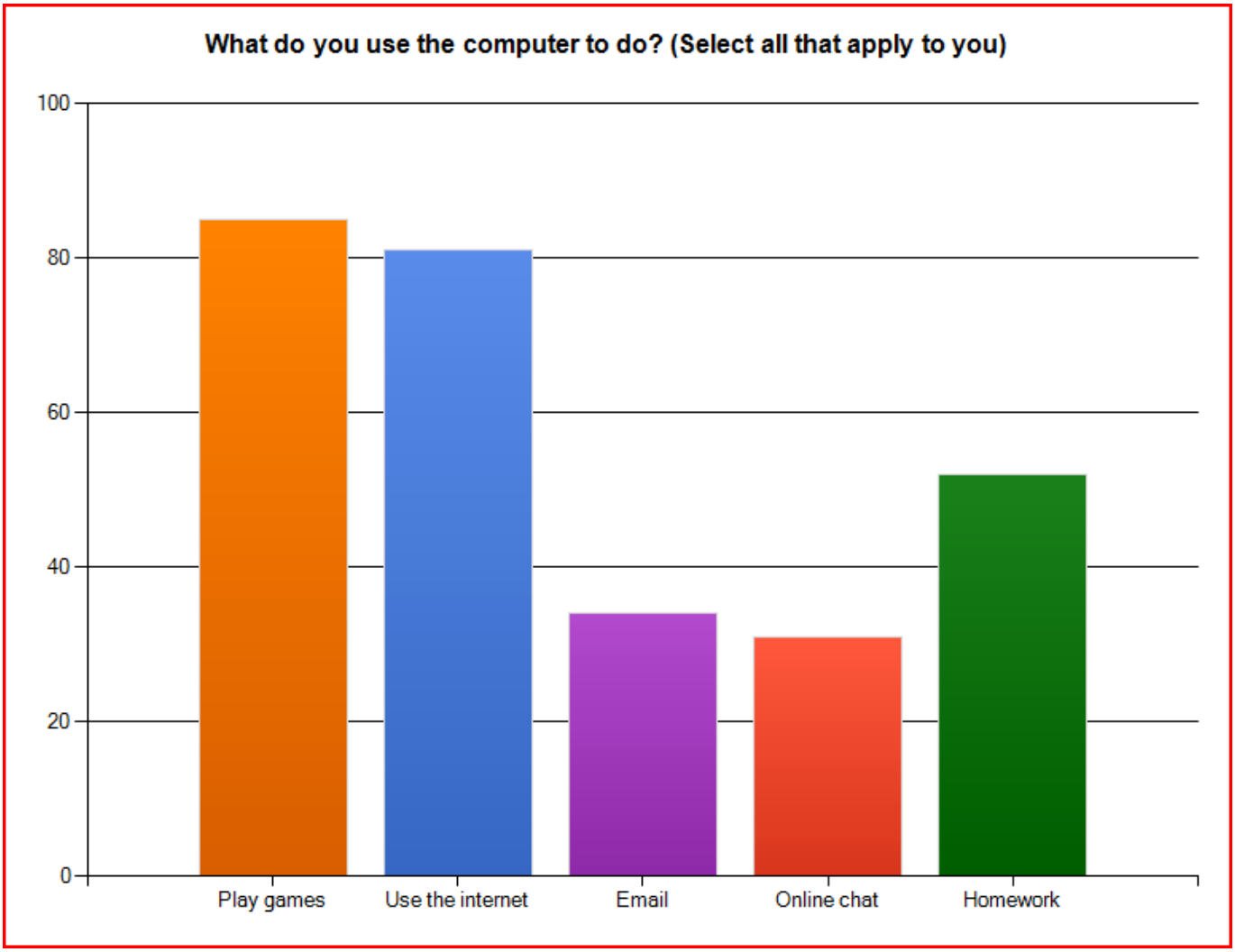


Figure 3. This graph illustrates popular computer activities.

Website features that capture and maintain student interest

The top three things that students reportedly enjoyed about various websites are shown in Figure 4. The top activities included: playing games (87%), watching videos and listening to music (tied at 67%) and drawing pictures (approximately 43%).

Students also wrote the following for “other”:

- Facebook (three respondents)
- Email to talk to friends
- I like to go on youtube
- Pictures
- Gmail
- Looking at pictures of animals

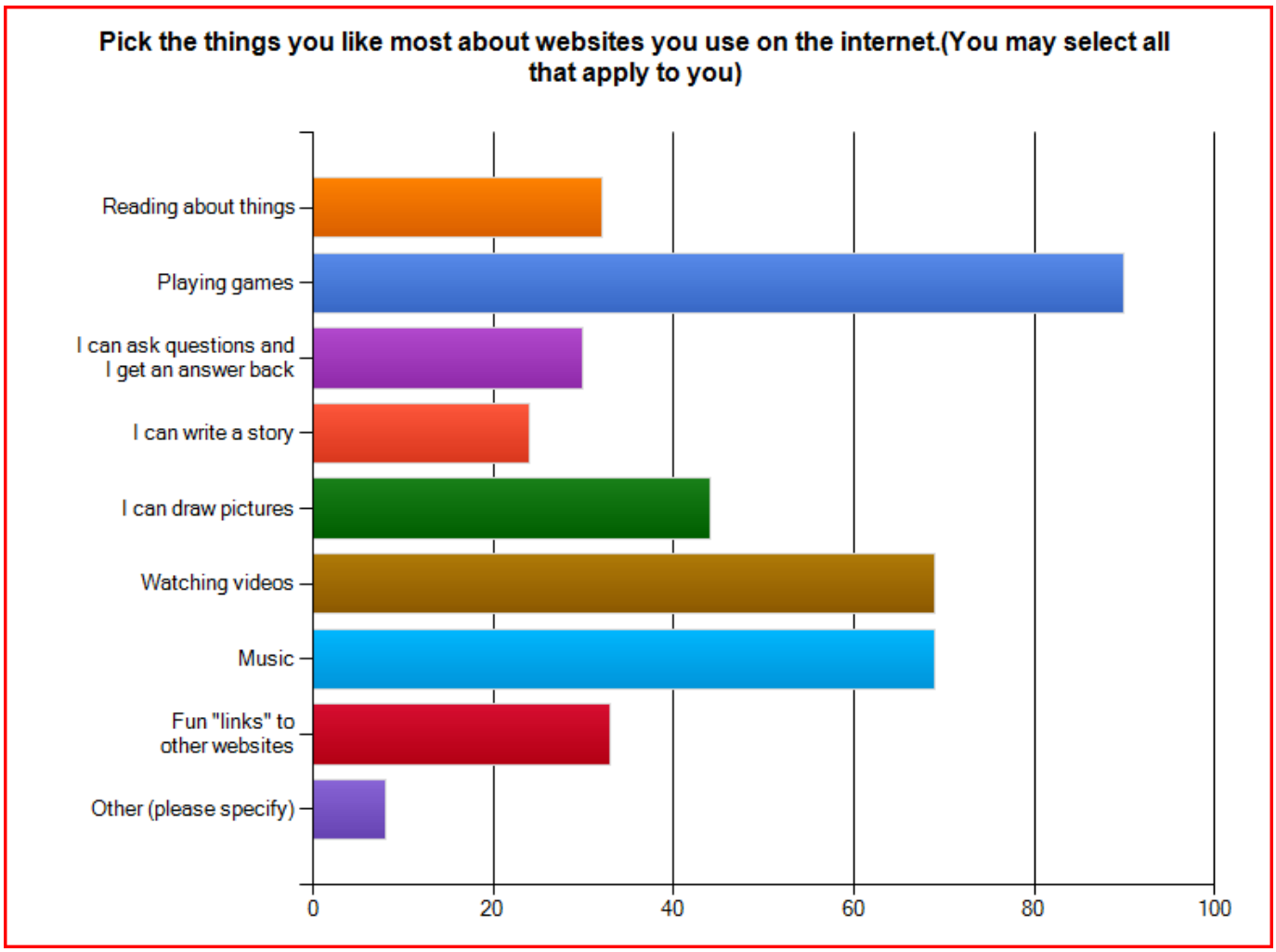
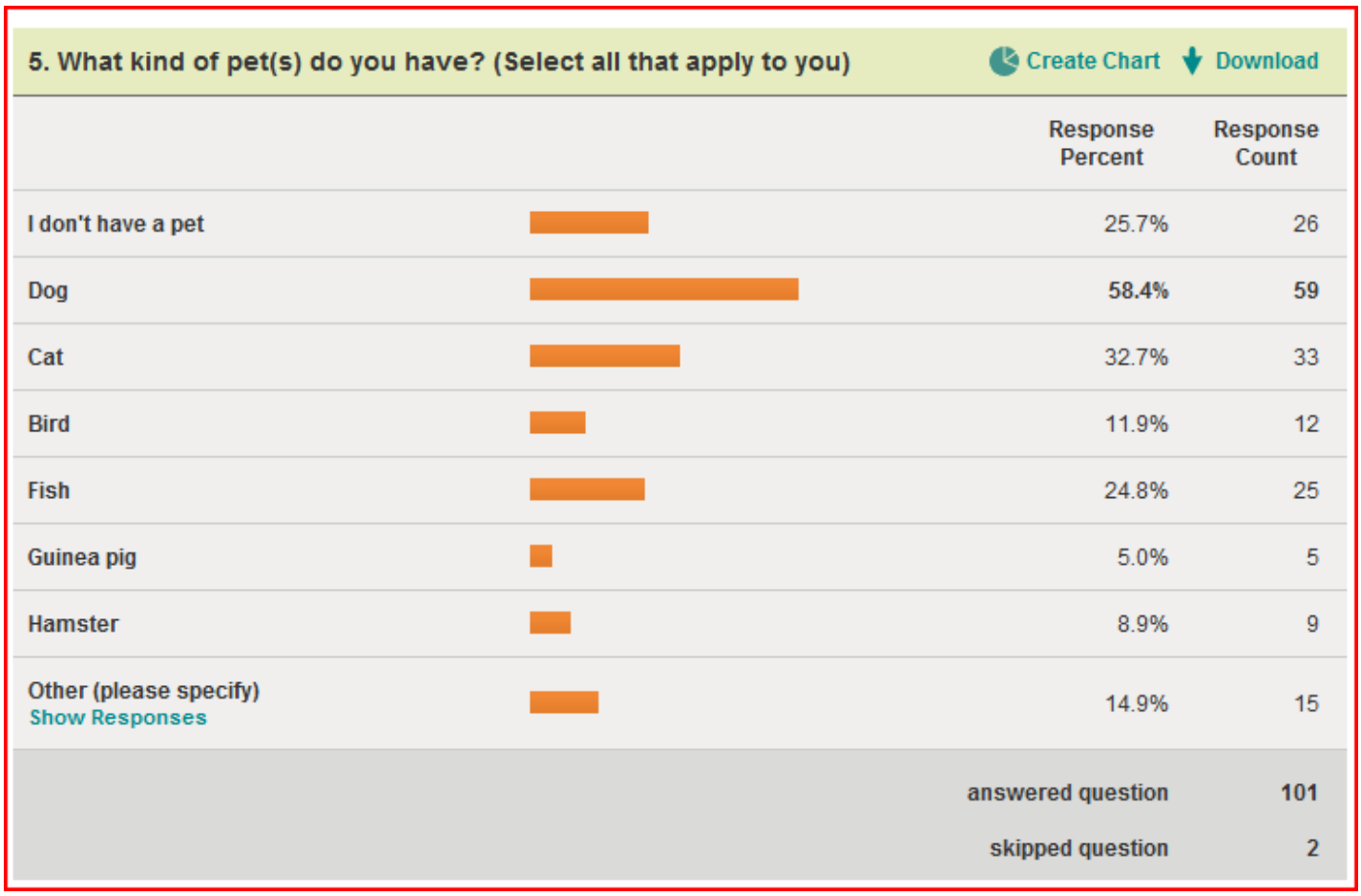


Figure 4. This graph shows the activities that students used on websites.

Pet ownership

Although two students skipped question five (pet ownership), of the remaining 101 participants slightly over 25% reported that they did not have a pet; roughly 58% indicated that

they owned dogs; nearly 33% owned cats; and the remaining respondents had a variety of other animals as pets (See Figure 5). Percentages total greater than 100% due to the fact that some respondents had multiple pet species.



5. What kind of pet(s) do you have? (Select all that apply to you) Create Chart Download

	Response Percent	Response Count
I don't have a pet	25.7%	26
Dog	58.4%	59
Cat	32.7%	33
Bird	11.9%	12
Fish	24.8%	25
Guinea pig	5.0%	5
Hamster	8.9%	9
Other (please specify) Show Responses	14.9%	15
answered question		101
skipped question		2

Figure 5. Students identify the types of pets that they own.

Desired pet-related website features

When students were asked about what types of activities or options they would like to have on a website about pets or other animals, approximately 10% of students indicated that they were not interested in learning about animals. However, the overwhelming majority selected a variety of options for a pet-related website (See Figure 6). Students selected games,

fun facts about animals, videos, information about what makes pets sick and how to care for pets, and several other options for a pet-related website.

In addition to the close-ended options listed for the question, students wrote the following when they selected “other”:

- Talking about animal rescuers
- Community service were (sic) I can work with animals
- How to take care of kittens
- How to react to certian (sic) animals
- How to know what pet would be right for you
- Where I can get animals
- Games
- I like to figure out about what pets can eat to (sic)!

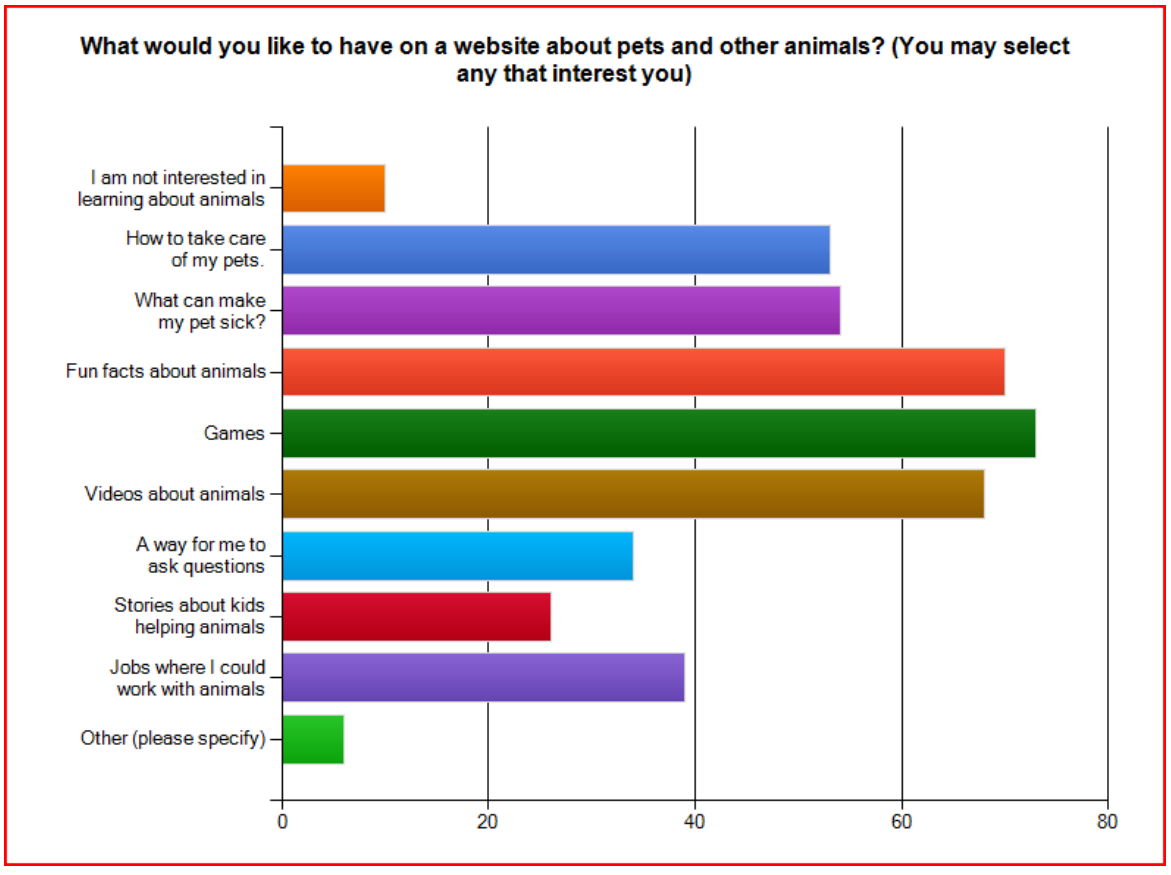


Figure 6. Students share what they are interested in having on a pet-related website.

Several of the survey questions were examined using filters or crosstab functions in an effort to identify geographic differences (between the Iowa and Georgia students), grade level similarities/differences, or preference differences between genders. These findings are shared below.

Geographic differences

Computer usage: Roughly 43% of Iowa students access a computer every day compared to 21% of the Georgia students. Over 49% of Iowa students reported having access to a computer at least one time per week versus 68% of Georgia students. In addition, Georgia students indicated that they had greater access to a computer at school than at home.

Iowa students who participated in the survey indicated that they used the computer to do the following (from most to least frequent):

- play games
- use the internet
- send email
- engage in online chats
- do homework

The Georgia participants used computers for (from most to least frequent):

- homework
- playing games
- using the internet

Website features: Games dominant the "most liked" features of websites. Both Iowa and Georgia students selected "playing games" over 84% of the time. Watching videos and listening to music also ranked high in popularity with both populations.

Reading information was least popular with Iowa students (<20%) while 63% of Georgia students indicated that they liked to read information on the websites they visit. A possible bias

impacting the responses of the Georgia students is that the classroom teacher had to assist with computer access and her proximity (or assisting in reading questions/answers) may have influenced the students to select “read information” more frequently.

While greater than 65% of Iowa students like to write stories or use creative drawing features on websites, just over 20% of the Georgia students chose these response options.

Pet ownership: A major difference in the Iowa and Georgia populations was identified with the question, “What kind of pet(s) do you have?” Although 10% of the Iowa students indicated that they did not have a pet, greater than 70% of the Georgia students reported not owning a pet. Dogs, cats, fish and birds were the most common pets owned by Iowa students. Four Georgia students had dogs and one had fish.

Pet Website: The next question on the survey, “What would you like to have on a website about pets and other animals?” sought to ferret out the features that would entice students to frequent a pet-related website. The responses from the Iowa students revealed that they wanted games (70%), videos about animals (64%), fun facts (63%), information about what could make their pets sick (63%), how to care for pets (56%), jobs where they could work with animals (48%), a way to ask questions (39%), and stories about kids helping animals (26.8%).

Georgia students wanted fun facts about animals (84%), videos about animals (84%), games (79%), how to care for pets (26%), and what can make my pet sick (10%). Interestingly, none of the Georgia students selected the “jobs where I could work with animals” option.

Grade level similarities or differences

Table 2 reveals that games were very popular with all grade levels surveyed for this project. Watching videos and listening to music were also desirable activities.

When examining grade level differences, approximately 46% of third grade students indicated that they enjoyed reading about things on the internet versus 19% of sixth graders. One possible explanation for the difference in reading interest may be because reading is still relatively "new" to many third grade students. In general, an increase in grade level appeared to correspond to a decreased interest in reading. In contrast, 11.4% of third graders like to use "fun links to other websites" compared to roughly 36% of fourth graders and 43% of sixth grade respondents. As grade level increased, interest in exploring "fun links" also increased. The differences observed regarding the "fun links" may be related to computer experience--particularly using the internet. Lack of experience using navigational features may account for the decreased number of third graders who selected this response compared to fourth and sixth graders. The older students also may possess increased computer literacy and have greater access to computers. Many of these differences are consistent with the findings of Nielson (2010) who reported that age or grade level differences can significantly change student perception of whether or not a website is enjoyable.

Table 2.

Website features: Response similarities and differences by grade levels.

Pet Website SurveyMonkey

Pick the things you like most about websites you use on the internet. (You may select all that apply to you)

	What grade are you in? My grade in school is				
	3rd grade	4th grade	5th grade	6th grade	Response Totals
Reading about things	45.7% (16)	35.7% (5)	**100.0% (1)**	18.9% (10)	31.1% (32)
Playing games	**85.7% (30)**	**85.7% (12)**	**100.0% (1)**	**88.7% (47)**	**87.4% (90)**
I can ask questions and I get an answer back	34.3% (12)	50.0% (7)	0.0% (0)	20.8% (11)	29.1% (30)
I can write a story	22.9% (8)	50.0% (7)	0.0% (0)	17.0% (9)	23.3% (24)
I can draw pictures	34.3% (12)	35.7% (5)	**100.0% (1)**	49.1% (26)	42.7% (44)
Watching videos	71.4% (25)	50.0% (7)	**100.0% (1)**	67.9% (36)	67.0% (69)
Music	51.4% (18)	35.7% (5)	**100.0% (1)**	84.9% (45)	67.0% (69)
Fun "links" to other websites	11.4% (4)	35.7% (5)	**100.0% (1)**	43.4% (23)	32.0% (33)

Respondents were asked to identify the features that they would like to have on a website about pets and other animals. Table 3 highlights the importance of games for all grade levels surveyed for this project. Students also indicated that they would like to have videos and fun facts about animals and information about taking care of their pets. In order to avoid one area of potential bias in the survey, students were given the option of responding: "I am not interested in learning about animals". Ten percent of respondents were not interested in learning about animals. While there were several areas where the responses of the different grade levels were similar, differences also were noted.

One area where a grade level difference could be seen related to the option of learning about jobs where they could work with animals. Approximately 51% of sixth graders selected

the option of learning about these types of jobs compared to 26% of third graders and 21% of fourth grade students. Sixth graders (49%) also were more likely to select the response regarding "a way to ask questions" than the younger students (20% for third grade, 7% for fourth grade). It may be possible to attribute these differences to age, maturity, and "experience" in school and in computer literacy.

Table 3.

Grade level similarities or differences regarding pet-related website features.

6. What would you like to have on a website about pets and other animals? (You may select any that interest you) Create Chart Download

	What grade are you in? My grade in school is				
	3rd grade	4th grade	5th grade	6th grade	Response Totals
I am not interested in learning about animals	5.7% (2)	21.4% (3)	0.0% (0)	9.4% (5)	9.7% (10)
How to take care of my pets.	42.9% (15)	35.7% (5)	**100.0% (1)**	60.4% (32)	51.5% (53)
What can make my pet sick?	34.3% (12)	35.7% (5)	**100.0% (1)**	67.9% (36)	52.4% (54)
Fun facts about animals	**77.1% (27)**	**50.0% (7)**	0.0% (0)	67.9% (36)	68.0% (70)
Games	68.6% (24)	28.6% (4)	**100.0% (1)**	**83.0% (44)**	**70.9% (73)**
Videos about animals	71.4% (25)	28.6% (4)	**100.0% (1)**	71.7% (38)	66.0% (68)
A way for me to ask questions	20.0% (7)	7.1% (1)	0.0% (0)	49.1% (26)	33.0% (34)
Stories about kids helping animals	17.1% (6)	28.6% (4)	0.0% (0)	30.2% (16)	25.2% (26)
Jobs where I could work with animals	25.7% (9)	21.4% (3)	0.0% (0)	50.9% (27)	37.9% (39)
Other (please specify)	0 replies (0.0%)	1 reply (7.1%)	0 replies (0.0%)	5 replies (9.4%)	5.8% (6)
answered question	35	14	1	53	**103**
				skipped question	0

Gender preferences identified in the survey

Daily use of a computer was reported by 47% of males report compared to 27% of females. A question that came to mind when considering these differences was related to whether the boys gained access to the computers more frequently as a result of possible increased assertive behavior. When asked to identify the "things they liked the most about websites that they visited" (See Table 4), more males (93%) reported liking games compared to females (79%); boys (73%) selected watching videos more often than girls (59%); a higher percentage of boys (73%) liked to listen to music compared to girls (59%); more girls (41%) selected reading about things compared to boys (24%); and girls (34%) also selected "writing stories" more often than boys (15%). Bekker, Beusmans, Keyson, & Lloyd (2003) also reported gender differences in their study.

Table 4.

Gender preferences regarding website features.

4. Pick the things you like most about websites you use on the internet. (You may select all that apply to you) Create Chart Download

	Are you male or female?		
	Male	Female	Response Totals
Reading about things	23.7% (14)	40.9% (18)	31.1% (32)
Playing games	**93.2% (55)**	**79.5% (35)**	**87.4% (90)**
I can ask questions and I get an answer back	27.1% (16)	31.8% (14)	29.1% (30)
I can write a story	15.3% (9)	34.1% (15)	23.3% (24)
I can draw pictures	42.4% (25)	43.2% (19)	42.7% (44)
Watching videos	72.9% (43)	59.1% (26)	67.0% (69)
Music	72.9% (43)	59.1% (26)	67.0% (69)
Fun "links" to other websites	28.8% (17)	36.4% (16)	32.0% (33)
Other (please specify)	1 reply (1.7%)	7 replies (15.9%)	7.8% (8)
answered question	59	44	103
		skipped question	0

Table 5 shows gender-specific responses to the question: “What would you like to have on a website about pets and other animals?” An interesting difference in gender responses was observed for the answer “jobs where I could work with animals”. Females selected this response nearly twice as often as males (52.3% of females compared to 27.1% of males). This

was an interesting finding given the gender shift in schools of veterinary medicine from historically male-dominated classes to present day entering classes that are over 80% female. In addition, more boys (12%) selected “not interested in learning about animals” than girls (6.8%).

Table 5.

Gender preferences regarding pet-related website features.

6. What would you like to have on a website about pets and other animals? (You may select any that interest you) Create Chart Download

	Are you male or female?		
	Male	Female	Response Totals
I am not interested in learning about animals	11.9% (7)	6.8% (3)	9.7% (10)
How to take care of my pets.	52.5% (31)	50.0% (22)	51.5% (53)
What can make my pet sick?	47.5% (28)	59.1% (26)	52.4% (54)
Fun facts about animals	62.7% (37)	**75.0% (33)**	68.0% (70)
Games	**76.3% (45)**	63.6% (28)	**70.9% (73)**
Videos about animals	64.4% (38)	68.2% (30)	66.0% (68)
A way for me to ask questions	28.8% (17)	38.6% (17)	33.0% (34)
Stories about kids helping animals	20.3% (12)	31.8% (14)	25.2% (26)
Jobs where I could work with animals	27.1% (16)	52.3% (23)	37.9% (39)
Other (please specify)	2 replies (3.4%)	4 replies (9.1%)	5.8% (6)
answered question	59	44	103
		skipped question	0

Interpretations

The data collected for this project support the assertion that children should be included early in the design process (Barab, Thomas, Dodge, Carteaux, and Tuzun, 2005; Bekker,

Beusmans, Keyson, and Lloyd, 2003; Facer, Joiner, Stanton, Reid, Hull, and Kirk, 2004; Interaction Design and Children, 2003; Lazaris, 2009; Rieber, Luke, & Smith, 1998; Williamson, 2003). In addition, the insights gained by consulting the prospective end-users have increased the researcher's awareness and understanding of the potential complexity of designing a website for children in grades 3-6.

This study suggests that a pet-related website would appeal to and be used by students in grades 3-6; however, the results also suggest that designing an appropriate website would be complex due to the need to design for several age groups. In addition to the complexity of website design related to the age issue, there were gender and geographic differences identified in this limited study which could contribute to increased design challenges. These results are consistent with those of Neilson (2010) who reported his findings regarding the importance of considering the age of the target population when designing websites and Bekker, Beusmans, Keyson, & Lloyd (2003) who identified gender differences that would potentially influence website or gaming designs.

This study was limited by the data collection instrument used to collect information from the target population. If observations had been conducted as students used a variety of existing pet-related websites (See Appendix E for a list of pet-related websites) and if these observations had been followed by interviews of the students perhaps more detailed information may have been collected about what the participants liked or did not like about the features offered by the websites. Observations might permit a researcher to identify accessibility differences between age groups or grade levels. These data collection methods may uncover additional gender-specific preferences which would influence website design. In addition to observations and interviews, students could be invited to "design their own" pet website using pencil/paper;

snapshots of computer images could be inserted on a “webpage” to illustrate what they want to have on a website; or they may be able to use basic website design software to create a website. These artifacts would provide additional information that a website designer could use to shape the final product. The following action planning section addresses the next phase or series of steps that could be taken to expand or continue this project.

Action planning

Organizational level

The next step for this project would include identifying the appropriate contact people within the organization and then presenting the findings of this action research project to individuals within the company who are involved in the development of client education or public education materials. The company does have some web-based materials; however, the vast majority of the materials are designed for use by the adult consumer.

Expansion opportunities

This project could be expanded to include collaboration with small groups of students on the actual design process. These students could design prototypes of websites and determine the types of information about which they are interested in learning. Depending on available resources and student knowledge of technology, the students could participate in “no tech, low tech, or high tech” design by:

- Using traditional pencil and paper methods to draw or write about their ideas
- Using digital cameras or digital video cameras to tell their personal pet or animal-related stories
- Using basic design software to create a website

An additional consideration that must be addressed relates to ensuring that the proposed website is accessible for disabled students. How will the material contained on the website be accessed by students who have visual or hearing deficits? Arnone (2007) offers website designers several suggestions that permit improved access for students with physical disabilities or learning disabilities. These include using a simplified layout and readable text; providing text alternatives for photos or graphics; using multiple modalities: video, podcast, audio clips, graphic organizers, etc. when presenting content information; utilizing a consistent navigation system; providing captions or text-based summaries for videos; incorporating appropriate color contrasts—particularly for individuals with visual impairments; and avoiding the overuse of animation so that distractions are minimized.

How does a website design team blend what students in grades 3 through 6 identify as important and interesting with what students with disabilities need in order to have full access? Are these one and the same? If accessibility considerations are kept front and center as the website is designed, will the final product be appropriate for all children in the target population? How does one account for differences in gender preferences and keep a design project on track to meet deadlines and stay within a budget? How important is it to recognize geographic influences and differences when designing a website? These are just a few questions that come to mind when considering the prospect of designing a pet-related website for students in grades 3-6. Given sufficient resources (time, money, personnel, etc.), perhaps—one day—this website will exist!

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Appendices

A. Literature matrix
B. Letters to principals, students, and parents (adapted from Mills, 2011)
C. Survey questions
D. Graphs of findings
E. List of pet-related websites for children